

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (withdrawn): A roller, comprising:

a cylindrical core member, comprising a first portion having a first diameter, a second portion having a second diameter which is smaller than the first diameter, and a step portion continuously connecting the first portion and the second portion; and

a rubber layer, secured to an outer periphery of the core member so as to cover the first portion and a part of the step portion.

2. (withdrawn): The roller as set forth in claim 1, wherein a longitudinal end portion of the rubber layer is protruded from the step portion in an axial direction of the core member, so as to have a flat face extending in a direction perpendicular to the axial direction.

3. (withdrawn): The roller as set forth in claim 1, wherein both of a boundary between the first portion and the step portion and a boundary between the step portion and the second portion are rounded.

4. (withdrawn): The roller as set forth in claim 1, wherein the first portion is formed by applying a hydroforming work to a cylindrical member having the second diameter.

5. (withdrawn): The roller as set forth in claim 1, wherein the second portion is formed by applying a plastic work to a cylindrical member having the first diameter.

6. (withdrawn): The roller as set forth in claim 1, wherein:

the second portion is formed by applying a mechanical work to a cylindrical member having the first diameter; and

the rubber layer is secured so as to avoid a portion where the mechanical work is applied.

7. (withdrawn): A device for fixing a toner image on a recording medium, comprising:

a first roller, in which a heat source is incorporated; and

a second roller, brought into contact with the first roller to form a nip portion therebetween through which the recording medium is passed,

wherein at least one of the first roller and the second roller comprises:

a cylindrical core member, comprising a first portion having a first diameter, a second portion having a second diameter which is smaller than the first diameter, and a step portion continuously connecting the first portion and the second portion; and

a rubber layer, secured to an outer periphery of the core member so as to cover the first portion and a part of the step portion.

8. (withdrawn): A device for fixing a toner image on a recording medium, comprising:

a first roller, in which a heat source is incorporated;

a heat-resistant belt member, stretched by a second roller and a stretcher and circulated therearound, the belt member brought into contact with the first roller to form a nip portion therebetween through which the recording medium is passed,

wherein at least one of the first roller and the second roller comprises:

a cylindrical core member, comprising a first portion having a first diameter, a second portion having a second diameter which is smaller than the first diameter, and a step portion continuously connecting the first portion and the second portion; and

a rubber layer, secured to an outer periphery of the core member so as to cover the first portion and a part of the step portion.

9. (withdrawn): An image forming apparatus for forming a toner image on a recording medium, the apparatus comprising the device for fixing the toner image on the recording medium, as set forth in claim 7.

10. (withdrawn): An image forming apparatus for forming a toner image on a recording medium, the apparatus comprising the device for fixing the toner image on the recording medium, as set forth in claim 8.

11. (withdrawn): A roller, comprising:

a cylindrical core member, comprising a first portion having a first diameter, a second portion having a second diameter which is smaller than the first diameter, and a step portion continuously connecting the first portion and the second portion; and

a rubber layer, secured to an outer periphery of the core member so as to cover the first portion, the step portion and a part of the second portion.

12. (withdrawn): The roller as set forth in claim 11, wherein a longitudinal end portion of the rubber layer is protruded from the step portion in an axial direction of the core member, so as to have a flat face extending in a direction perpendicular to the axial direction.

13. (withdrawn): The roller as set forth in claim 11, wherein both of a boundary between the first portion and the step portion and a boundary between the step portion and the second portion are rounded.

14. (withdrawn): The roller as set forth in claim 11, wherein the first portion is formed by applying a hydroforming work to a cylindrical member having the second diameter.

15. (withdrawn): The roller as set forth in claim 11, wherein the second portion is formed by applying a plastic work to a cylindrical member having the first diameter.

16. (withdrawn): The roller as set forth in claim 11, wherein:

the second portion is formed by applying a mechanical work to a cylindrical member having the first diameter; and

the rubber layer is secured so as to cover a portion where the mechanical work is applied.

17. (withdrawn): A device for fixing a toner image on a recording medium, comprising:

a first roller, in which a heat source is incorporated; and

a second roller, brought into contact with the first roller to form a nip portion therebetween through which the recording medium is passed,

wherein at least one of the first roller and the second roller comprises:

a cylindrical core member, comprising a first portion having a first diameter, a second portion having a second diameter which is smaller than the first diameter, and a step portion continuously connecting the first portion and the second portion; and

a rubber layer, secured to an outer periphery of the core member so as to cover the first portion, the step portion and a part of the second portion.

18. (withdrawn): A device for fixing a toner image on a recording medium, comprising:

a first roller, in which a heat source is incorporated;

a heat-resistant belt member, stretched by a second roller and a stretcher and circulated therearound, the belt member brought into contact with the first roller to form a nip portion therebetween through which the recording medium is passed,

wherein at least one of the first roller and the second roller comprises:

a cylindrical core member, comprising a first portion having a first diameter, a second portion having a second diameter which is smaller than the first diameter, and a step portion continuously connecting the first portion and the second portion; and

a rubber layer, secured to an outer periphery of the core member so as to cover the first portion the step portion and a part of the second portion.

19. (withdrawn): An image forming apparatus for forming a toner image on a recording medium, the apparatus comprising the device for fixing the toner image on the recording medium, as set forth in claim 17.

20. (withdrawn): An image forming apparatus for forming a toner image on a recording medium, the apparatus comprising the device for fixing the toner image on the recording medium, as set forth in claim 18.

21. (withdrawn): A roller, comprising:

a cylindrical core member, comprising a first portion having a first diameter, a second portion having a second diameter which is smaller than the first diameter, and a step portion continuously connecting the first portion and the second portion;

a rubber layer, secured to an outer periphery of the core member so as to cover the first portion, the step portion and a part of the second portion; and

a support member, provided on the rubber layer situated in the second portion so as to rotatably support the core member.

22. (withdrawn): The roller as set forth in claim 21, wherein a longitudinal end portion of the rubber layer has a flat face extending in a direction perpendicular to an axial direction of the core member.

23. (withdrawn): The roller as set forth in claim 21, wherein both of a boundary between the first portion and the step portion and a boundary between the step portion and the second portion are rounded.

24. (withdrawn): The roller as set forth in claim 21, wherein the first portion is formed by applying a hydroforming work to a cylindrical member having the second diameter.

25. (withdrawn): The roller as set forth in claim 21, wherein the second portion is formed by applying a plastic work to a cylindrical member having the first diameter.

26. (withdrawn): The roller as set forth in claim 21, wherein:

the second portion is formed by applying a mechanical work to a cylindrical member having the first diameter; and

the rubber layer is secured so as to cover a portion where the mechanical work is applied.

27. (withdrawn): A device for fixing a toner image on a recording medium, comprising:

a first roller, in which a heat source is incorporated; and

a second roller, brought into contact with the first roller to form a nip portion therebetween through which the recording medium is passed,

wherein at least one of the first roller and the second roller comprises:

a cylindrical core member, comprising a first portion having a first diameter, a second portion having a second diameter which is smaller than the first diameter, and a step portion continuously connecting the first portion and the second portion;

a rubber layer, secured to an outer periphery of the core member so as to cover the first portion, the step portion and a part of the second portion; and

a support member, provided on the rubber layer situated in the second portion so as to rotatably support the core member.

28. (withdrawn): A device for fixing a toner image on a recording medium, comprising:

a first roller, in which a heat source is incorporated;

a heat-resistant belt member, stretched by a second roller and a stretcher and circulated therearound, the belt member brought into contact with the first roller to form a nip portion therebetween through which the recording medium is passed,

wherein at least one of the first roller and the second roller comprises:

a cylindrical core member, comprising a first portion having a first diameter, a second portion having a second diameter which is smaller than the first diameter, and a step portion continuously connecting the first portion and the second portion; and

a rubber layer, secured to an outer periphery of the core member so as to cover the first portion the step portion and a part of the second portion; and

a support member, provided on the rubber layer situated in the second portion so as to rotatably support the core member.

29. (withdrawn): An image forming apparatus for forming a toner image on a recording medium, the apparatus comprising the device for fixing the toner image on the recording medium, as set forth in claim 27.

30. (withdrawn): An image forming apparatus for forming a toner image on a recording medium, the apparatus comprising the device for fixing the toner image on the recording medium, as set forth in claim 28.

31. (currently amended): A device for fixing a toner image on a recording medium, comprising:

a first roller, comprising:

a heat source;

a rotatable, cylindrical first core member;

a first elastic member, rotatable together with the first core member;

a first rubber layer, secured to an outer periphery of the first core member; and

a second roller, comprising:

a rotatable, cylindrical second core member;

a second elastic member, rotatable together with the second core member; and

a second rubber layer, secured to an outer periphery of the second core member, and brought into contact with the first rubber layer to form a nip portion therebetween through which the recording medium is passed, and such that one of the first roller and the second roller is rotated by the rotation of the other;

wherein the first elastic member and the second elastic member are brought into contact with each other at a position ~~where is~~ other than the nip portion;

the first elastic member has a hardness which is lower than a hardness of the first rubber layer; and

the second elastic member has a hardness which is lower than a hardness of the second rubber layer.

32. (currently amended): A device for fixing a toner image on a recording medium, comprising:

a first roller, comprising:

a heat source;

a rotatable, cylindrical first core member;

a first elastic member, rotatable together with the first core member;

a first rubber layer, secured to an outer periphery of the first core member; and

a heat-resistant belt member, stretched by a second roller and a stretcher and circulated therearound, the second roller, comprising:

a rotatable, cylindrical second core member;

a second elastic member, rotatable together with the second core member; and

a second rubber layer, secured to an outer periphery of the second core member,
wherein:

the belt member is brought into contact with the first rubber layer to form a nip portion
therebetween through which the recording medium is passed;~~and~~

the first elastic member and the second elastic member are brought into contact with each
other at a position ~~where is~~ other than the nip portion;

the first elastic member has a hardness which is lower than a hardness of the first rubber
layer; and

the second elastic member has a hardness which is lower than a hardness of the second
rubber layer.

33-34. (canceled).

35. (original): The fixing device as set forth in claim 31, further comprising:

a first support member, which rotatably supports the first roller; and

a second support member, which rotatably supports the second roller, wherein:

the first elastic member is arranged closer to a longitudinal end of the first roller than the
first support member; and

the second elastic member is arranged closer to a longitudinal end of the second roller than the second support member.

36. (original): The fixing device as set forth in claim 32, further comprising:

a first support member, which rotatably supports the first roller; and

a second support member, which rotatably supports the second roller, wherein:

the first elastic member is arranged closer to a longitudinal end of the first roller than the first support member; and

the second elastic member is arranged closer to a longitudinal end of the second roller than the second support member.

37. (original): The fixing device as set forth in claim 35, wherein:

the first support member and the first elastic member are provided at each of longitudinal ends of the first roller; and

the second support member and the second elastic member are provided at each of longitudinal ends of the second roller.

38. (original): The fixing device as set forth in claim 36, wherein:

the first support member and the first elastic member are provided at each of longitudinal ends of the first roller; and

the second support member and the second elastic member are provided at each of longitudinal ends of the second roller.

39. (original): An image forming apparatus for forming a toner image on a recording medium, the apparatus comprising the device for fixing the toner image on the recording medium, as set forth in claim 31.

40. (original): An image forming apparatus for forming a toner image on a recording medium, the apparatus comprising the device for fixing the toner image on the recording medium, as set forth in claim 32.